

APPENDIX D

Noise Measurement Report

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Noise Measurement Report

I. Purpose

While FAA Order 1050.1E requires that the evaluation of aircraft noise be conducted based on approved computer noise model calculations, it is valuable to consider the noise modeling results in the context of the local ambient noise environment. To that end, a field noise measurement program was conducted at select sites throughout the New York/New Jersey/Philadelphia Airspace Redesign EIS study area to provide a sample of ambient and cumulative noise values for consideration.

The primary focus of the measurement program was to collect and calculate the day/night average noise levels (DNL) at each specific site. The noise measurements contain all noise recorded at a site, and have been parsed into the noise contributions from both aircraft and non-aircraft sources. The findings provide context of background and cumulative noise levels in which any changes in modeled noise exposure resulting from an airspace alteration can be considered. This report provides a general description of the measurement process, a description of the specific sites selected for noise measurement, a summary of the onsite observations made during the measurement period, and a quantitative analysis of the noise measurement results.

In addition to the total DNL at each monitoring site, several other metrics were also computed from the measured data as supplemental information. These include the following:

- ➔ L_{50} – Sound level at which 50% of the measured 1-second samples are above and 50% are below. This is generally considered to be an estimation of background noise levels by FAA.
- ➔ Aircraft DNL – The DNL value of only the noise events that were correlated with aircraft overflights based on the radar flight track data.
- ➔ Non-Aircraft DNL – The DNL value of noise resulting from the subtraction of the Aircraft DNL value from the Total DNL measured at each site.
- ➔ Aircraft L_{max} – Range of maximum sound level associated with correlated aircraft events.
- ➔ Average number of aircraft noise events per day.
- ➔ Most common types of aircraft noise events.

II. Procedures/Instrumentation

The noise measurement program was conducted in two phases. The first phase of noise measurements was performed between December 3 and December 21, 2001. Measurements

were conducted at 15 sites throughout the study area, for a continuous 3 to 4 day period for each site. The second phase of measurements was conducted between August 12 and August 30, 2002. Measurement was conducted at 16 sites for a 3 to 4 day period. In general, the Phase II sites were the same or in close proximity to their first phase location. An additional site was added for the second phase because access could not be coordinated at the time of the Phase I measurements.

The equipment used to measure noise levels at the sites included a high-quality microphone with a weather resistant microphone screen, a B&K 2236 Type 1 noise monitor, and a HP 200 LX palmtop computer. The microphone was mounted on a tripod, and the noise monitor was connected to a standard marine battery. The noise monitor was set to continuously measure instantaneous noise levels (dBA) throughout the measurement period. The computer recorded output from the monitor in one second intervals for the entire period of measurement. At each site the noise monitors were calibrated with certified acoustical calibrators immediately before measurement commenced and immediately after measurement ended. Between four and six similar units were deployed in the field at any give time during the program.



As with any technical field effort where electronic instrumentation is exposed to the elements for an extended period of time, electrical and mechanical malfunctions can, and often do, occur. This effort was no exception. Thus, during each measurement period, the monitors were checked periodically by a two-person crew. Where malfunctions were observed, field repairs were undertaken. In most cases the crews were able to restore system functionality with minimal data loss. In some cases, however, some data was lost as the equipment was reset. These instances are noted in the site descriptions.



The crew also made qualitative assessments while observing and logging noise events and noise patterns for a total of 6 hours at each site. At most sites, photographs were taken to verify correct setup of the monitor, and to document the location and surroundings.

III. Site Locations

While there is no end to the number of potential noise measurement sites in a 30,000+ square mile study area, issues such as cost and time often create a practical limit to the scope of any noise measurement program. Accordingly, this noise measurement program focused on collecting a sample of data within strategic areas that were directly related to the range of

alternatives evaluated and the local land uses within the Study Area. Key components used in evaluating site locations included:

- ➔ Areas that will could potentially be over-flown by new procedures proposed by each alternative airspace configuration;
- ➔ Areas that have existing overflights, but where the traffic volume may change based on operation mode or utilization;
- ➔ Noise sensitive and/or 4f/historic sites that may be identified within the two previous areas indicated;
- ➔ Typical traffic patterns conducted by uncontrolled-VFR operations to/from local airports (typically low-traffic facilities) within the study area;
- ➔ Provide a wide range of analysis across the geographical study area;
- ➔ Other public/FAA input.

Sites were chosen in order to assess noise in a variety of settings. Rural and urban sites were monitored as well as public parks, historic sites, and residential neighborhoods. The sites were also chosen to span the study area, with particular attention paid to noise sensitive areas and areas where there have been aircraft noise complaints.

Table 1 provides a summary of the measurement locations while **Figure 1** illustrates a map of the site locations within the study area.

IV. Site Descriptions and Noise Level Results

This section provides both qualitative descriptions and quantitative analysis for each measurement site. First, site descriptions are given based primarily on qualitative observations made by the two-person crews who were on site for a minimum of 6 hours during each phase of measurements. The data detailed for each site include measurement period, site location, nearby land use, ambient noise patterns, non-aircraft noise sources, and aircraft noise sources. Second, the quantitative results are presented. These results include total DNL, aircraft DNL, non-aircraft DNL, L50 noise level, range of Lmax for aircraft noise events, average number of aircraft noise events per day, and the most common types of aircraft noise events.

The computation process for quantitative results merits some discussion. Total DNL at each site was directly calculated using the collected one-second dBA data. The maximum number of continuous 24 hour periods measured at each site was used, beginning with the first full hour of measurement for each phase. The number of continuous days varied by site both because of varied nature of start and stop times, and because of intermittent equipment failure for some sites. L50 was calculated using the same 24 hour periods as DNL.

Table 1 Noise Measurement Site Location Summary

| Site | Name | Location | Latitude | Longitude | Land Use | Dates Measured | Dates Measured |
|---------|-----------------------------|--------------------|----------|-----------|----------------------|---------------------|-------------------|
| Site 1a | Saugerties Residence | Saugerties, NY | 42.0766 | -74.0617 | Rural Residential | 12/3/01 - 12/7/01 | N/A |
| Site 1b | Stone Ridge Residence | Stone Ridge, NY | 41.8554 | -74.1552 | Rural Residential | N/A | 8/19/02 - 8/23/02 |
| Site 2 | Oliverea Residence | Oliverea, NY | 42.0130 | -74.4154 | Rural Park | 12/3/01 - 12/7/01 | 8/20/02 - 8/23/02 |
| Site 3 | Beaver Dam Sanctuary | Katonah, NY | 41.2469 | -73.6661 | Suburban Park | 12/3/01 - 12/7/01 | 8/19/02 - 8/23/02 |
| Site 4 | Stamford Residence | Stamford, CT | 41.0533 | -73.5047 | Suburban Residential | 12/3/01 - 12/7/01 | N/A |
| Site 5 | Robert Moses State Park | Fire Island, NY | 40.6292 | -73.2283 | Rural Park | 12/18/01 - 12/21/01 | 8/12/02 - 8/15/02 |
| Site 6 | Harbor Island Park | Mamaroneck, NY | 40.9446 | -73.7324 | Suburban Park | 12/3/01 - 12/7/01 | 8/19/02 - 8/23/02 |
| Site 7a | Staten Island Residence(a) | Staten Island, NY | 40.6385 | -74.1662 | Urban Residential | 12/17/01 - 12/21/01 | N/A |
| Site 7b | Staten Island Residence(b) | Staten Island, NY | 40.6394 | -74.1686 | Urban Residential | N/A | 8/12/02 - 8/16/02 |
| Site 8 | Carteret Residence | Carteret, NJ | 40.5873 | -74.2299 | Suburban Residential | N/A | 8/12/02 - 8/16/02 |
| Site 9 | Tourne Park | Boonton, NJ | 40.9084 | -74.4353 | Suburban Park | 12/10/01 - 12/14/01 | 8/26/02 - 8/30/02 |
| Site 10 | Morristown Nat. Hist. Park | Morristown, NJ | 40.7618 | -74.5436 | Rural Park | 12/10/01 - 12/14/01 | 8/26/02 - 8/30/02 |
| Site 11 | BWZ VOR | Schooley's Mtn, NJ | 40.7985 | -74.8233 | Rural | 12/11/01 - 12/14/01 | 8/26/02 - 8/30/02 |
| Site 12 | Twin Lights Historic Site | Highlands, NJ | 40.3968 | -73.9854 | Suburban Park | 12/10/01 - 12/14/01 | 8/26/02 - 8/30/02 |
| Site 13 | Brandywine Battlefield Park | Chadds Ford, PA | 39.8750 | -75.5713 | Rural Park | 12/18/01 - 12/21/01 | 8/14/02 - 8/16/02 |
| Site 14 | Colts Neck Residence | Colts Neck, NJ | 40.3113 | -74.1990 | Suburban Residential | 12/10/01 - 12/14/01 | 8/26/02 - 8/30/02 |
| Site 15 | Ardencroft Residence | Ardencroft, DE | 39.8043 | -75.4840 | Suburban Residential | 12/17/01 - 12/21/01 | 8/13/02 - 8/16/02 |
| Site 16 | Garden City Residence | Garden City, NY | 40.7182 | -73.6750 | Urban Residential | 12/17/01 - 12/21/01 | 8/12/02 - 8/16/02 |

In order to quantify the noise levels attributable specifically to aircraft, a noise correlation process was undertaken using FAA radar data collected during each measurement period. The analysis brought together the elements needed to evaluate what noise is attributable to aircraft as opposed to other noise sources. These elements include the one-second dBA noise level data from the measurements, radar flight data for the measurement periods, and geographical positions of each measurement site. The analysis process goes as follows:

1. The one-second dBA data is analyzed to determine when there are noise events. A noise event occurs when the noise level increases by a fixed threshold dBA level above the hourly L90 for a minimum duration. These thresholds and durations are presented in **Table 2**.

2. For the times when there are noise events, the geographical area surrounding each site is scanned to determine if there are any aircraft within a ground distance at which an aircraft could conceivably create noise at the site location. If there are aircraft within the vicinity, the noise event is attributed to the closest aircraft. If there are no aircraft, the noise event is assumed to be the result of some other source. All noise events categorized as aircraft events were accumulated to determine the DNL due to aircraft only for the measurement sites.

Table 2
Noise Event Threshold Settings

| Site | Minimum above L90 dBA | Minimum Duration (s) |
|-------------|--------------------------------------|---------------------------------|
| 1a | 8 | 15 |
| 1b | 8 | 15 |
| 2 | 8 | 15 |
| 3 | 8 | 15 |
| 4 | 6 | 15 |
| 5 | 5 | 15 |
| 6 | 7 | 20 |
| 7a | 9 | 14 |
| 7b | 9 | 14 |
| 8 | 6 | 15 |
| 9 | 5 | 20 |
| 10 | 6 | 20 |
| 11 | 5 | 15 |
| 12 | 5 | 15 |
| 13 | 6 | 20 |
| 14 | 6 | 20 |
| 15 | 7 | 15 |
| 16 | 8 | 20 |

Site 1a – Saugerties Residence – Site Description

Measurement period

Phase 1 measurement began Monday 12/3/01, and concluded Friday 12/7/01.

Location

Site 1a was a residence on Stoll Road; Saugerties, NY. This location is near Catskill State Park, approximately 95 miles north of the 3 major NYC airports. The monitor was placed in the yard, about 15 yards east of the east wall of the home, in an open area amongst a few tall pine trees.



Land Use

The area was as rural residential, with houses generally very widely spaced and settled within the rolling, wooded terrain. There were two other houses within a 300 yard radius. Predominant roadways near the site were as follows:

1. Stoll Road – Very lightly traveled rural road located approximately 60 yards north of noise monitor.
2. Route 212 Highway – Rural highway with some traffic located approximately 1 mile southeast of monitor.
3. Route 33 Highway – Very lightly traveled rural highway located approximately ½ mile west of monitor.

Ambient Noise

In general, this site was very quiet. During heavy traffic periods, minor background noise could be associated to Route 212 highway in the distance and to a lesser degree Route 33 Highway.

Non-Aircraft Noise Sources

Occasionally cars would pass on Stoll Road (3 - 4 per hour) creating noise events of 20 – 30 seconds. The owner of the house would leave and return a few times a day. Wildlife especially birds occasionally made noise. Two of the three observation days, a large truck made some minor noise working in the distance.

Aircraft Noise Sources

At Site 1a, there was a variety of routes flown by both propeller and jet aircraft, with aircraft events logged about 12 times per hour. The most prevalent route was a south bound path, typically flown approximately one mile to the west of the site, presumably an approach route to NYC. The route was usually flown by large jets, at a high altitude. Approximately ½ of the air traffic in the area was associated with this route. It is possible that some of the air traffic in the area could be attributed to Albany, but it is unclear how much.

Site 1a – Saugerties Residence – Noise Level Results**Site 1a - Cumulative Statistics**

| | |
|-----------------------|-------------|
| Total Days | 4 |
| Total DNL | 40.5 |
| Aircraft DNL | 25.5 |
| Non-Aircraft DNL | 40.3 |
| L50 | 31.0 |
| Aircraft Events / Day | 15 |
| Aircraft Lmax range | 37.6 - 67.1 |

Site 1a - 10 Most Common Aircraft Noise Events

| Aircraft Type | Operation Type | Airport | Number of Events |
|---------------|----------------|---------|------------------|
| B772 | A | KEWR | 4 |
| GLF4 | A | KTEB | 4 |
| A306 | A | KEWR | 2 |
| B72Q | D | KPHL | 2 |
| B762 | A | KEWR | 2 |
| BE58 | A | KLDJ | 2 |
| C650 | A | KTEB | 2 |
| DH8A | A | KLGA | 2 |
| GLF3 | A | KTEB | 2 |
| H25C | A | KTEB | 2 |

During the 4 days of measurement, 675 flights flew within a distance of approximately 9 miles of Site 1a. Of these flights 60 met the thresholds necessary to be called aircraft noise events. These events had Lmax levels ranging from 37.6 to 67.1 dBA. The most common types of aircraft noise events at this site are shown in the above table.

Site 1b – Stone Ridge Residence – Site DescriptionMeasurement period

Phase 2 measurement began Monday 8/19/02, and concluded Friday 8/23/02.

Location

Site 1b was a residence on Atwood Road, Stoneridge, NY. This location is 4 miles east of Catskill State Park, approximately 80 miles north of the 3 major NYC airports. The monitor was placed in the backyard, on the edge of heavily wooded area. During the measurement period an equipment malfunction was noted. The unit was able to be repaired in the field and was recalibrated and restarted. There was some loss of valid data



resulting in only two full 24-hour periods of valid data.

Land Use

The area was rural residential. Atwood Road had many cars passing throughout the observation period. Stone Ridge Main Street was located approximately 0.75 miles east of the site.

Ambient Noise

Main sources of ambient noise included insects and light background auto traffic.

Non-Aircraft Noise Sources

Children playing in the neighborhood were observed, as well as dogs barking. Some wildlife noise was noted, and many short duration noise events were noted from cars passing on Atwood Road.

Aircraft Noise Sources

Aircraft events were logged at a rate of 7 per hour during times of observation. A mixture of jets and props were noted, with many of the events being barely audible, and aircraft very high or not visible.

Site 1b – Stone Ridge Residence – Noise Level Results

Site 1b - Cumulative Statistics

| | |
|-----------------------|-------------|
| Total Days | 2 |
| Total DNL | 62.7 |
| Aircraft DNL | 26.9 |
| Non-Aircraft DNL | 62.7 |
| L50 | 47.0 |
| Aircraft Events / Day | 5 |
| Aircraft Lmax range | 54.3 - 64.8 |

Site 1b - 10 Most Common Aircraft Noise Events

| Aircraft Type | Operation Type | Airport | Number of Events |
|---------------|----------------|---------|------------------|
| E135 | A | KHPN | 2 |
| E145 | A | KHPN | 2 |
| B764 | A | KEWR | 1 |
| DC93 | A | KHPN | 1 |
| F100 | A | KHPN | 1 |
| F100 | A | KSWF | 1 |
| GLF4 | A | KHPN | 1 |

During the 2 days of measurement, 440 flights flew within a distance of approximately 9 miles of Site 1b. Of these flights 10 met the thresholds necessary to be called aircraft noise events. These events had Lmax levels ranging from 54.3 to 64.8 dBA. The most common types of aircraft noise events at this site are shown in the above table.

Site 2 – Oliverea Residence – Site Description

Measurement period

Phase 1 measurement began Monday 12/3/01, and concluded Friday 12/7/01.

Location

Site 2 was located in the Catskill State Park region, on the west side of Route 47 (Oliverea Road) in Oliverea, NY. This location is approximately 95 miles north-northwest of the 3 major NYC airports. The property consisted of a small log cabin rental unit, a tall garage for equipment, and a residence. The sign at the driveway entrance indicated that the location was also used for business purposes. The monitor was placed approximately 40 yards north of the wood cabin, within the densely wooded area.

Land Use

The site was located within the mountains of Catskill State Park, a rural setting. Directly across the road, approximately 250 yards from the monitor was the Winnisook Club with 10-15 condominium buildings. The one substantial roadway near the site was Route 47 highway approximately 60 yards east of the monitor. Traffic levels were very low, with approximately 10 cars an hour passing during peak times.



Ambient Noise

The ambient noise level was very low at this site. A creek could be heard running very softly in the distance. Occasionally, wind picked up to moderate levels, adding to the ambient level.

Non-Aircraft Noise Sources

The major source of non-aircraft noise was the construction work being done across the road at the Winnisook Club. Some heavy machinery was being operated during the workday including what sounded like tractors and chainsaws. Also, the resident at the site location would occasionally do some work with a small tractor in the driveway. Cars passed on Oliverea Road approximately 10 times an hour creating an event of about 30 seconds.

Aircraft Noise Sources

Air traffic in the area was light with only about 6 aircraft events per hour. Some large jet traffic was observed in the distance, but the noise was usually not substantial. Flight paths for the large jets were usually located to the south of the site with traffic moving eastward or to the east of the site with traffic moving southward. Propeller aircraft were also observed on these routes, but they would also occasionally fly closer to the measurement site and sometimes directly overhead.

Site 2 – Oliverea Residence – Noise Level Results**Site 2 - Cumulative Statistics**

| | |
|-----------------------|-------------|
| Total Days | 6 |
| Total DNL | 46.6 |
| Aircraft DNL | 23.2 |
| Non-Aircraft DNL | 46.6 |
| L50 | 34.5 |
| Aircraft Events / Day | 3 |
| Aircraft Lmax range | 44.3 - 65.4 |

Site 2 - 10 Most Common Aircraft Noise Events

| Aircraft Type | Operation Type | Airport | Number of Events |
|---------------|----------------|---------|------------------|
| C750 | A | KTEB | 2 |
| B733 | O | BWI | 1 |
| BE33 | O | XOVR | 1 |
| BE35 | O | XOVR | 1 |
| C182 | O | XOVR | 1 |
| C206 | A | KPNE | 1 |
| DH8A | A | KLGA | 1 |
| DH8A | A | KPHL | 1 |
| DH8A | O | BOS | 1 |
| F900 | A | KTEB | 1 |

During the 6 days of measurement, 1295 flights flew within a distance of approximately 9 miles of Site 2. Of these flights 15 met the thresholds necessary to be called aircraft noise events. These events had Lmax levels ranging from 44.3 to 65.4 dBA. The most common types of aircraft noise events at this site are shown in the above table.

Site 3 – Beaver Dam Sanctuary – Site DescriptionMeasurement period

Phase 1 measurement began Monday 12/3/01, and concluded Friday 12/7/01.

Phase 2 measurement began Monday 8/19/02, and concluded Friday 8/23/02.

Location

Site 3 was located at the north edge of Beaver Dam Sanctuary (Park) in Katonah, NY. This site is 34 miles north-northeast of La Guardia (LGA). The monitor was placed about 50 yards north of Beaver Dam Road just west of a horse riding trail in an area of vegetation overgrowth.

Land Use

The 220 acre Beaver Dam Sanctuary county park was located about 50 yards south of the monitor. A few homes were located about 50 yards east of the monitor, but the site was not a major residential area. Notable roadways in the vicinity were as follows:

1. Interstate 684 – major thoroughfare with heavy traffic 1/3 mile west of the monitor.
2. Beaver Dam Road – medium traffic road about 50 yards south of monitor.
3. Route 22 Highway – 300 yards northeast of monitor.

Ambient Noise

The dominating aspect of the ambient noise during observation periods was the automobile traffic on I-684.

Non-Aircraft Noise Sources

Cars passed by on Beaver Dam Road at a frequent pace (about 45 per hour) creating events between 15 and 30 seconds in duration. Beaver Dam Road seemed to be on a route for work trucks – possibly going to a landfill. During Phase 1, many brief events were logged as “metal banging” and “construction”. Some short noise events could be contributed to the homes near the monitor.

Aircraft Noise Sources

Aircraft activity was observed with moderate frequency at this location, with about 18 events logged per hour. However, much of the aircraft noise was reported as indistinguishable from the traffic noise from I-684. The only substantial aircraft noise events were propeller driven aircraft at low altitudes.

Site 3 – Beaver Dam Sanctuary – Noise Level Results

Site 3 - Cumulative Statistics

| | |
|-----------------------|-------------|
| Total Days | 7 |
| Total DNL | 59.7 |
| Aircraft DNL | 46.2 |
| Non-Aircraft DNL | 59.5 |
| L50 | 51.0 |
| Aircraft Events / Day | 39 |
| Aircraft Lmax range | 50.6 - 72.0 |

Site 3 - 10 Most Common Aircraft Noise Events

| Aircraft Type | Operation Type | Airport | Number of Events |
|---------------|----------------|---------|------------------|
| A320 | A | LGA | 6 |
| E145 | A | LGA | 6 |
| B738 | A | LGA | 5 |
| AT43 | A | EWR | 4 |
| AEST | D | TEB | 3 |
| AEST | A | TEB | 3 |
| BE58 | D | TEB | 3 |
| BE58 | A | TEB | 3 |
| AT43 | D | EWR | 2 |
| BE19 | D | HPN | 2 |

During the 7 days of measurement, 2165 flights flew within a ground distance of 3.8 miles of Site 3. Of these flights 276 met the thresholds necessary to be called aircraft noise events. These events had Lmax levels ranging from 50.6 to 72.0 dBA. The most common types of aircraft noise events at this site are shown in the above table. A large number of noise events were attributable to airport HPN, but did not have identifiable aircraft types.

Site 4 – Stamford Residence – Site Description

Measurement period

Phase 1 measurement began Monday 12/3/01, and concluded Friday 12/7/01.

Phase 2 measurement began Monday 8/19/02, and concluded Friday 8/23/02.

Location

Site 4 was a residence located on Cambridge Road; Stamford, CT. The site was located approximately 11 miles east of Westchester County Airport (HPN) and 27 miles northeast of LGA. The monitor was placed in the small backyard. During the summer measurement period an equipment malfunction was noted. The unit was able to be repaired in the field and was recalibrated and restarted. There was some loss of valid data resulting in 21-hours of valid data during Phase 2.

Land Use

The residence was located on the east edge of a fairly dense suburban neighborhood (about 2 homes per acre). To the east, there was one home and about 70 yards between the residence and the 200 acre Holly Pond. Nearby roadways were:

1. Weed Avenue – street about 50 yards east of monitor with heavy traffic.
2. Interstate 95 – located 3/5 mile northwest of monitor.
3. State Highway 1 – located ½ mile northeast of monitor.

Ambient Noise

Weed Avenue received heavy traffic during the observation periods, causing the most background noise. Other nearby highway noise also contributed. The ambient was reported to consistently remain in the 50 – 60 dBA range.

Non-Aircraft Noise Sources

During Phase 1, the neighboring house was being remodeled creating periods of construction noise. Also, dogs barked occasionally during aircraft noise events. Only road traffic was noted during Phase 2.

Aircraft Noise Sources

The site received a moderate amount of air traffic (about 15 events logged per hour) much of which was small general aviation aircraft. Several identifiable traffic patterns were observed seemingly belonging to various airports.

Site 4 – Stamford Residence – Noise Level Results**Site 4 - Cumulative Statistics**

| | |
|-----------------------|-------------|
| Total Days | 3 |
| Total DNL | 54.2 |
| Aircraft DNL | 44.1 |
| Non-Aircraft DNL | 53.7 |
| L50 | 46.0 |
| Aircraft Events / Day | 22 |
| Aircraft Lmax range | 53.7 - 72.8 |

Site 4 - 10 Most Common Aircraft Noise Events

| Aircraft Type | Operation Type | Airport | Number of Events |
|---------------|----------------|---------|------------------|
| DH8A | A | LGA | 5 |
| B738 | D | LGA | 3 |
| DH8A | D | LGA | 3 |
| B190 | A | HPN | 2 |
| B744 | D | JFK | 2 |
| C560 | A | HPN | 2 |
| CL60 | A | HPN | 2 |
| JS41 | A | HPN | 2 |
| LJ35 | A | HPN | 2 |
| A319 | D | LGA | 1 |

During the 3 days of measurement, 651 flights flew within a ground distance of 4.1 miles of Site 4. Of these flights 67 met the thresholds necessary to be called aircraft noise events. These events had Lmax levels ranging from 53.7 to 72.8 dBA. The most common types of aircraft noise events at this site are shown in the above table.

Site 5 – Robert Moses State Park – Site DescriptionMeasurement period

Phase 1 measurement began Monday 12/17/01, and concluded Friday 12/21/01.

Phase 2 measurement began Monday 8/12/02, and concluded Friday 8/16/02.

Location

Site 5 was located on Fire Island, New York in Robert Moses State Park. This location is approximately 29 miles east of JFK, 12 miles southeast of Republic (FRG), and 13 miles southwest of Islip (ISP). The monitor was placed amongst some vegetation about 5 yards east of parking lot 5, and about 600 yards west of the Fire Island Lighthouse.

Land Use

Fire Island is bordered by the Atlantic Ocean on the south and the Great South Bay on the north. The monitor was placed in the approximate north-south midpoint of the island with about 400 yards to either shore. Aside from the parking lot and boardwalk, the area is undeveloped, populated only by wildlife. The only applicable roadway was the extended Robert Moses Causeway which received very light traffic.

Ambient Noise

The surf of the ocean and the wind contributed to the ambient level which was reported to typically be between 45 and 50 dBA.

Non-Aircraft Noise Sources

There was very little non-aircraft noise generated at this site. Cars starting and moving in the parking lot were the source of most noise not attributable to aircraft, and these were infrequent occurrences. Also the weather station near the lighthouse created some noise. Frequent wind gusts were recorded several days during measurement.

Aircraft Noise Sources

Aircraft events were recorded with a frequency of 10-15 per hour. Most events were logged as high altitude with a high proportion being propeller driven aircraft.

Site 5 – Robert Moses State Park – Noise Level Results**Site 5 - Cumulative Statistics**

| | |
|-----------------------|-------------|
| Total Days | 5 |
| Total DNL | 67.3 |
| Aircraft DNL | 45.1 |
| Non-Aircraft DNL | 67.3 |
| L50 | 59.0 |
| Aircraft Events / Day | 12 |
| Aircraft Lmax range | 53.3 - 73.4 |

Site 5 - 10 Most Common Aircraft Noise Events

| Aircraft Type | Operation Type | Airport | Number of Events |
|---------------|----------------|---------|------------------|
| B744 | A | JFK | 6 |
| B772 | A | JFK | 6 |
| DV20 | O | UNK | 5 |
| J328 | A | JFK | 4 |
| B763 | A | JFK | 3 |
| B737 | O | UNK | 2 |
| C172 | O | UNK | 2 |
| E135 | A | JFK | 2 |
| PA32 | O | UNK | 2 |
| A346 | A | JFK | 1 |

During the 5 days of measurement, 595 flights flew within a ground distance of 3.8 miles of Site 5. Of these flights 59 met the thresholds necessary to be called aircraft noise events. These events had Lmax levels ranging from 53.3 to 73.4 dBA. The most common types of aircraft noise events at this site are shown in the above table.

Site 6 – Harbor Island Park – Site DescriptionMeasurement period

Phase 1 measurement began Monday 12/3/01, and concluded Friday 12/7/01.

Phase 2 measurement began Monday 8/19/02, and concluded Friday 8/23/02.

Location

Site 6 was located in Harbor Island Park in Mamaroneck, NY. The site location was 8 miles south of Westchester (HPN) and 14 miles north-northeast of La-Guardia (LGA). The monitor was placed in a central location of the park, south of the tennis courts, next to an out building and a fence. A playground was located about 50 yards southeast of the monitor.

Land Use

Harbor Island Park is a community park with tennis courts, baseball fields, and playgrounds. It is about 40 acres in area and is bordered on 3 sides by Mamaroneck Harbor with docks for boats. The closest shore was about 100 yards southwest of the monitor. Nearby roadways were:

1. The small park roads and parking lots used by visitors to navigate through the park.
2. Boston Post Road – medium traffic road 300 yards northwest of monitor.



Ambient Noise

The playground in the park was usually busy and created a steady background noise, along with the other noise typically made by people in the park. Roadway traffic noise along Boston Post Road also had some effect.

Non-Aircraft Noise Sources

Boats motoring in the harbor created several noise events. During Phase 1, some construction work was occurring near the park intermittently. During Phase 2, lawn mower noise was observed.

Aircraft Noise Sources

Air traffic was very heavy, with most events being air carrier traffic associated with one airport, probably La Guardia. About 30 aircraft events were logged per hour. There was a significant variety in the altitudes of the aircraft as they passed.

Site 6 – Harbor Island Park – Noise Level Results**Site 6 - Cumulative Statistics**

| | |
|-----------------------|-------------|
| Total Days | 7 |
| Total DNL | 57.3 |
| Aircraft DNL | 47.8 |
| Non-Aircraft DNL | 56.8 |
| L50 | 47.3 |
| Aircraft Events / Day | 71 |
| Aircraft Lmax range | 48.1 - 81.4 |

Site 6 - 10 Most Common Aircraft Noise Events

| Aircraft Type | Operation Type | Airport | Number of Events |
|---------------|----------------|---------|------------------|
| DH8A | A | LGA | 59 |
| B738 | A | LGA | 44 |
| A320 | A | LGA | 42 |
| A319 | A | LGA | 32 |
| B738 | D | LGA | 20 |
| E145 | A | LGA | 19 |
| B190 | A | LGA | 14 |
| B752 | A | LGA | 14 |
| E135 | A | LGA | 12 |
| B735 | D | EWR | 11 |

During the 7 days of measurement, 3052 flights flew within a ground distance of 3.1 miles of Site 6. Of these flights 494 met the thresholds necessary to be called aircraft noise events. These events had Lmax levels ranging from 48.1 to 81.4 dBA. The most common types of aircraft noise events at this site are shown in the above table.

Site 7a – Staten Island Residence (a) – Site DescriptionMeasurement period

Phase 1 measurement began Monday 12/17/01, and concluded Friday 12/21/01.

Location

Site 7a was a residence in northwest Staten Island on South Avenue; Staten Island, NY. This location is 4 miles south-southeast of Newark Airport (EWR) and 4 miles east-northeast of Linden Airport (LDJ). The monitor was located near a fence behind the house on the edge of the driveway.



During the measurement period an equipment malfunction was noted. The unit was able to be repaired in the field and was recalibrated and restarted. There was some loss of valid data resulting in only two full 24-hour periods of valid data.

Land Use

The neighborhood is very densely developed area with 3 - 4 homes per acre. The site is located about 300 yards south of Newark Bay across which is Newark Airport. Major roadways near the site were:

1. South Avenue – major arterial street located 30 yards east of site.
2. Interstate 278 – located about 1 mile southwest of site.
3. State Highway 440 – located about 1 mile east of site.
4. Many neighboring local streets.

Ambient Noise

The ambient noise was primarily generated by road traffic around the site. Also, ground noise at Newark airport contributed to background noise. The ambient was reported as typically between 44 and 47 dBA during observation times.

Non-Aircraft Noise Sources

The vehicular traffic on South Avenue was heavy, but not consistent enough to create a constant background. About 200 vehicles passed per hour, usually around 40 mph.

Aircraft Noise Sources

This site received an abundance of air traffic, much of which was presumably associated with Newark. A wide variety of aircraft flew departure and arrival routes as recorded by the observers. On average, about 30 flights/hour were logged during observation times.

Site 7a – Staten Island Residence (a) – Noise Level Results**Site 7a - Cumulative Statistics**

| | |
|-----------------------|-------------|
| Total Days | 2 |
| Total DNL | 67.6 |
| Aircraft DNL | 66.3 |
| Non-Aircraft DNL | 61.5 |
| L50 | 52.0 |
| Aircraft Events / Day | 308 |
| Aircraft Lmax range | 57.3 - 88.0 |

Site 7a - 10 Most Common Aircraft Noise Events

| Aircraft Type | Operation Type | Airport | Number of Events |
|---------------|----------------|---------|------------------|
| B735 | D | EWR | 60 |
| B752 | D | EWR | 58 |
| E145 | D | EWR | 34 |
| B738 | D | EWR | 30 |
| MD80 | D | EWR | 25 |
| B72Q | D | EWR | 22 |
| B733 | D | EWR | 20 |
| E145 | A | EWR | 20 |
| B73G | D | EWR | 16 |
| B752 | A | EWR | 16 |

During the 2 days of measurement, 1296 flights flew within a ground distance of 2.4 miles of Site 7a. Of these flights 615 met the thresholds necessary to be called aircraft noise events. These events had Lmax levels ranging from 57.3 to 88.0 dBA. The most common types of aircraft noise events at this site are shown in the above table.

Site 7b – Staten Island Residence (b) – Site DescriptionMeasurement period

Phase 2 measurement began Monday 8/12/02, and concluded Friday 8/16/02.

Location

Site 7b was a residence in northwest Staten Island on Martineau; Staten Island, NY. This location is 4 miles south-southeast of Newark Airport (EWR) and 4 miles east-northeast of Linden Airport (LDJ). The monitor was located in the backyard of the house. This location is only about 250 yards west of Site 7a.



Land Use

The neighborhood is very densely developed area with 3-4 homes per acre. The site is located about 300 yards south of Newark Bay across which is Newark Airport. Major roadways near the site were:

1. Interstate 278 – located about 1 mile southwest of site.
2. State Highway 440 – located about 1 mile east of site.
3. Many neighboring local streets.

Ambient Noise

The ambient noise was primarily generated by insect noise and road traffic around the site. The ambient was reported as typically in the middle 50's.

Non-Aircraft Noise Sources

Construction in the neighborhood was noted on each day of observation. Other sources of noise from the neighborhood were music from apartment buildings, children playing, and barking dogs.

Aircraft Noise Sources

This site received an abundance of air traffic, most of which were jet departures from Newark. On average, about 37 flights/hour were logged during observation times.

Site 7b – Staten Island Residence (b) – Noise Level Results**Site 7b - Cumulative Statistics**

| | |
|-----------------------|-------------|
| Total Days | 3 |
| Total DNL | 64.1 |
| Aircraft DNL | 62.7 |
| Non-Aircraft DNL | 58.7 |
| L50 | 51.0 |
| Aircraft Events / Day | 244 |
| Aircraft Lmax range | 59.9 - 86.6 |

Site 7b - 10 Most Common Aircraft Noise Events

| Aircraft Type | Operation Type | Airport | Number of Events |
|---------------|----------------|---------|------------------|
| B752 | D | EWR | 76 |
| MD80 | D | EWR | 61 |
| B735 | D | EWR | 54 |
| B738 | D | EWR | 48 |
| B733 | D | EWR | 34 |
| B72Q | D | EWR | 27 |
| DC93 | D | EWR | 25 |
| A306 | D | EWR | 22 |
| DC10 | D | EWR | 22 |
| B762 | D | EWR | 21 |

During the 3 days of measurement, 3723 flights flew within a ground distance of 2.4 miles of Site 7b. Of these flights 732 met the thresholds necessary to be called aircraft noise events. These events had Lmax levels ranging from 59.9 to 86.8 dBA. The most common types of aircraft noise events at this site are shown in the above table.

Site 8 – Carteret Residence – Site Description

Measurement period

Phase 2 measurement began Monday 8/12/02, and concluded Friday 8/16/02.

Location

Site 8 was a residence in northern Carteret, NJ on Charlotte Street. This location is 7.5 miles south-southwest of Newark Airport (EWR). The monitor was located in the backyard of the property. During the measurement period an equipment malfunction was noted. The unit was able to be repaired in the field and was recalibrated and restarted. There was some loss of valid data resulting in only two full 24-hour periods of valid data.

Land Use

The neighborhood is a suburban region with fairly densely spaced housing. The predominant roadway in the area is I-95 which is located about 0.4 miles west of the site.

Ambient Noise

The ambient sources noted by the observers were insect noise, faint roadway traffic, and air conditioning units of residences in the area. The ambient was observed to be typically in the upper 40's and low 50's.



Non-Aircraft Noise Sources

Typical sources of suburban neighborhood noise were observed including barking dogs, passing cars, and lawn mowers.

Aircraft Noise Sources

This site received an abundance of air traffic, much of which was presumably associated with Newark. Mostly departure routes were recorded by the observers. On average, about 20 flights/hour were logged during observation times.

Site 8 – Carteret Residence – Noise Level Results**Site 8 - Cumulative Statistics**

| | |
|-----------------------|-------------|
| Total Days | 2 |
| Total DNL | 66.1 |
| Aircraft DNL | 57.5 |
| Non-Aircraft DNL | 65.4 |
| L50 | 52.0 |
| Aircraft Events / Day | 149 |
| Aircraft Lmax range | 55.1 - 83.1 |

Site 8 - 10 Most Common Aircraft Noise Events

| Aircraft Type | Operation Type | Airport | Number of Events |
|---------------|----------------|---------|------------------|
| B738 | D | EWR | 37 |
| B735 | D | EWR | 34 |
| B752 | D | EWR | 31 |
| E145 | D | EWR | 24 |
| B733 | D | EWR | 22 |
| MD80 | D | EWR | 14 |
| B737 | D | EWR | 10 |
| DC93 | D | EWR | 9 |
| B722 | D | EWR | 7 |
| DC10 | D | EWR | 7 |

During the 2 days of measurement, 1032 flights flew within a ground distance of 3.1 miles of Site 8. Of these flights 298 met the thresholds necessary to be called aircraft noise events. These events had Lmax levels ranging from 55.1 to 83.1 dBA. The most common types of aircraft noise events at this site are shown in the above table.

Site 9 – Tourne Park – Site DescriptionMeasurement period

Phase 1 measurement began Monday 12/10/01, and concluded Friday 12/14/01.

Phase 2 measurement began Monday 8/26/02, and concluded Friday 8/30/02.

Location

Site 9 was located in Tourne Park in Boonton, NJ. This location is 8 miles north of Morristown (MMU) and 20 miles northwest of Newark (EWR). The monitor was in a central location of the park in the woods, about 100 yards from a baseball field and a small road through the park.



Land Use

Tourne Park is a local park providing wilderness trails and some recreational facilities. The closest suburban area to the monitor was a residential neighborhood about 600 yards southeast of the monitor. There were no major roadways in the immediate vicinity.

Ambient Noise

Generally the site was quiet. Only weather, wildlife, and faint distant traffic noise contributed to the ambient levels. During Phase 2, insects were a major contributor.

Non-Aircraft Noise Sources

During both phases, construction events were reported ranging from 1 to 30 second intervals. On rare occasions cars would pass on the park road.

Aircraft Noise Sources

Aircraft events were rare with only 10-12 being recorded per hour. It was reported that most of these were only visual, and when aircraft noise was distinguishable, it was very faint. Most aircraft were high altitude and some distance away.

Site 9 – Tourne Park – Noise Level Results**Site 9 - Cumulative Statistics**

| | |
|-----------------------|-------------|
| Total Days | 6 |
| Total DNL | 61.0 |
| Aircraft DNL | 48.5 |
| Non-Aircraft DNL | 60.8 |
| L50 | 43.8 |
| Aircraft Events / Day | 124 |
| Aircraft Lmax range | 39.2 - 79.1 |

Site 9 - 10 Most Common Aircraft Noise Events

| Aircraft Type | Operation Type | Airport | Number of Events |
|---------------|----------------|---------|------------------|
| B735 | D | EWR | 28 |
| B752 | A | EWR | 24 |
| B735 | A | EWR | 17 |
| E145 | D | EWR | 16 |
| GLF4 | D | TEB | 16 |
| B738 | A | EWR | 15 |
| B752 | D | EWR | 15 |
| E145 | A | EWR | 14 |
| DC93 | D | EWR | 13 |
| B733 | A | EWR | 12 |

During the 6 days of measurement, 2880 flights flew within a ground distance of 3.1 miles of Site 9. Of these flights 744 met the thresholds necessary to be called aircraft noise events. These

events had Lmax levels ranging from 39.2 to 79.1 dBA. The most common types of aircraft noise events at this site are shown in the above table.

Site 10 – Morristown National Historic Park – Site Description

Measurement period

Phase 1 measurement began Monday 12/10/01, and concluded Friday 12/14/01.

Phase 2 measurement began Monday 8/26/02, and concluded Friday 8/30/02.

Location

Site 10 was located in the Jockey Hollow area of Morristown National Historic Park in Morristown, NJ. The site was located 7 miles west-southwest of Morristown (MMU) and 19 miles west-northwest of Newark (EWR). The monitor was placed approximately 100 yards northeast of the visitors center, in a wooded area surrounded by open fields, nature trails, and very lightly traveled roads.

Land Use

Jockey Hollow is located in the southwest corner of Morristown National Historic Park which spans approximately 2500 acres. The area is mostly wilderness and generally quiet. There was approximately 1 mile between the monitor and developed land in both the east and the west direction. The only major roadway was Interstate 287 located approximately 1 mile southeast of the site.

Ambient Noise

The ambient noise level was generally low. Contributors to the ambient were weather, wildlife, and traffic on I-287. During Phase 2, insects were a major contributor.

Non-Aircraft Noise Sources

Non-aircraft noise events were rarely reported. Occasionally, cars of park visitors would pass. Sometimes noise from pedestrian visitors or wildlife occurred. For one day during Phase 2, some heavy trucks were occasionally hauling loads through the park roads.



Aircraft Noise Sources

About 20 aircraft events were recorded per hour during observation times, with most being faint events. A fairly even mix of propeller and jet aircraft was noted.

Site 10 – Morristown National Historic Park – Noise Level Results**Site 10 - Cumulative Statistics**

| | |
|-----------------------|-------------|
| Total Days | 5 |
| Total DNL | 57.8 |
| Aircraft DNL | 47.4 |
| Non-Aircraft DNL | 57.4 |
| L50 | 43.5 |
| Aircraft Events / Day | 126 |
| Aircraft Lmax range | 44.8 - 76.0 |

Site 10 - 10 Most Common Aircraft Noise Events

| Aircraft Type | Operation Type | Airport | Number of Events |
|---------------|----------------|---------|------------------|
| B735 | A | EWR | 50 |
| E145 | A | EWR | 37 |
| MD80 | D | EWR | 31 |
| B752 | A | EWR | 23 |
| B733 | A | EWR | 22 |
| B735 | D | EWR | 16 |
| B738 | A | EWR | 16 |
| B772 | A | EWR | 15 |
| B73G | A | EWR | 14 |
| B738 | D | EWR | 13 |

During the 5 days of measurement, 2054 flights flew within a ground distance of 2.4 miles of Site 10. Of these flights 632 met the thresholds necessary to be called aircraft noise events. These events had Lmax levels ranging from 44.8 to 76.0 dBA. The most common types of aircraft noise events at this site are shown in the above table.

Site 11 – BWZ VOR – Site DescriptionMeasurement period

Phase 1 measurement began Monday 12/10/01, and concluded Friday 12/14/01.

Phase 2 measurement began Monday 8/26/02, and concluded Friday 8/30/02.

Location

Site 11 was the Broadway (BWZ) VOR/DME located on Schooley's Mountain in New Jersey. The site is located 34 miles west-northwest of Newark (EWR). The monitor was placed on top of a hill in an open field surrounded by small wooded areas. The VOR/DME was located about 100 yards northeast of the monitor.



Land Use

The monitor was in a rural location surrounded by woodlands and farmland. There were a few rural roads near the location but none received significant traffic.

Ambient Noise

Most of the time the site was quiet, with only wildlife and weather providing background noise. Insects were predominant during the second phase, as was a large amount of rainfall.

Non-Aircraft Noise Sources

During both phases, events were created by distant construction and farm equipment. Very few non-aircraft noise events were observed. On one day during the first phase a grain hopper ran constantly at a nearby farm creating a noise level consistently above 60 dB.

Aircraft Noise Sources

The site predictably received many overflights (22 per hour), dominated by commercial airline traffic. Most were traveling west at high altitude and created faint noise events of approximately 90 seconds in duration.

Site 11 – BWZ VOR – Noise Level Results**Site 11 - Cumulative Statistics**

| | |
|-----------------------|-------------|
| Total Days | 5 |
| Total DNL | 60.7 |
| Aircraft DNL | 42.3 |
| Non-Aircraft DNL | 60.7 |
| L50 | 47.3 |
| Aircraft Events / Day | 54 |
| Aircraft Lmax range | 46.8 - 75.6 |

Site 11 - 10 Most Common Aircraft Noise Events

| Aircraft Type | Operation Type | Airport | Number of Events |
|---------------|----------------|---------|------------------|
| B735 | A | EWR | 27 |
| B752 | A | EWR | 18 |
| B738 | A | EWR | 17 |
| MD80 | A | EWR | 16 |
| B733 | A | EWR | 15 |
| E145 | A | EWR | 15 |
| DC10 | A | EWR | 12 |
| B73G | A | EWR | 9 |
| B752 | D | EWR | 8 |
| B72Q | A | EWR | 6 |

During the 5 days of measurement, 1218 flights flew within a ground distance of 2.4 miles of Site 11. Of these flights 272 met the thresholds necessary to be called aircraft noise events.

These events had Lmax levels ranging from 46.8 to 75.6 dBA. The most common types of aircraft noise events at this site are shown in the above table.

Site 12 – Twin Lights Historic Site – Site Description

Measurement period

Phase 1 measurement began Monday 12/10/01, and concluded Friday 12/14/01.

Phase 2 measurement began Monday 8/26/02, and concluded Friday 8/30/02.

Location

Site 12 was located at the Twin Lights Historic Site in Highlands, NJ. This site is 20 miles south-southwest of JFK and 23 miles south-southeast of Newark (EWR). The monitor was located near an abandoned home on a wooded hillside east of the lighthouse building.

Land Use

The Twin Lights Historic Site is a 3-acre property with two lighthouses and visitor accommodations. The site is 400 yards west of the Sandy Hook Bay, and about 800 yards west of the Atlantic Ocean. To the south and southwest, the area is mostly wooded residential, while to the north is suburban development. The most prominent roadway was state highway 36 located approximately 200 yards northeast of the monitor.

Ambient Noise

The ambient noise could be partially attributed to auto traffic from nearby highway 36. Also, during both phases, there was some rainy, windy weather which contributed to the ambient noise. There was a substantial amount of insect noise during Phase 2.

Non-Aircraft Noise Sources

There was some noise attributable to boats in the bay east of the site. During the second phase, there was intermittent construction on the lighthouse towers.



Aircraft Noise Sources

About 12 aircraft events per hour were recorded during observation hours. The traffic was dominated by jets, most traveling north, presumably arrivals to NYC airports. Some aircraft were observed traveling south, possibly Newark or JFK departures.

Site 12 – Twin Lights Historic Site – Noise Level Results**Site 12 - Cumulative Statistics**

| | |
|-----------------------|-------------|
| Total Days | 7 |
| Total DNL | 62.2 |
| Aircraft DNL | 52.7 |
| Non-Aircraft DNL | 61.7 |
| L50 | 52.5 |
| Aircraft Events / Day | 126 |
| Aircraft Lmax range | 49.8 - 93.3 |

Site 12 - 10 Most Common Aircraft Noise Events

| Aircraft Type | Operation Type | Airport | Number of Events |
|---------------|----------------|---------|------------------|
| A320 | A | JFK | 44 |
| A320 | D | JFK | 32 |
| B762 | D | JFK | 30 |
| B744 | A | JFK | 27 |
| JS41 | D | JFK | 26 |
| B763 | A | JFK | 25 |
| B752 | D | JFK | 22 |
| B752 | A | JFK | 22 |
| B763 | D | JFK | 22 |
| A306 | A | JFK | 17 |

During the 7 days of measurement, 2737 flights flew within a ground distance of 4.1 miles of Site 12. Of these flights 880 met the thresholds necessary to be called aircraft noise events. These events had Lmax levels ranging from 49.8 to 93.3 dBA. The most common types of aircraft noise events at this site are shown in the above table.

Site 13 – Brandywine Battlefield Park – Site DescriptionMeasurement period

Phase 1 measurement began Tuesday 12/18/01, and concluded Friday 12/21/01.

Phase 2 measurement began Monday 8/12/02, and concluded Friday 8/16/02.

Location

Site 13 was located in the 500-acre Brandywine Battlefield Park in Chadds Ford, PA. This location is 17 miles west of Philadelphia International (PHL). The monitor was placed in the northeast corner of the park in an elevated open clearing.



Land Use

The area surrounding the monitor was a state park with mostly hilly, wooded terrain. There were 3 residences located adjacent to the park perimeter. Approximately 1/3 mile to the south of the monitor was state highway 1, which was heavily traveled. There was one park access road, receiving very little traffic, and there was a railroad about 2/3 mile south of the monitor, which was used infrequently.

Ambient Noise

The main contributor to the ambient noise was the constant flow of traffic on highway 1. In addition, there was some rustling of tree and bush limbs during windy conditions. Insect noise was predominant in Phase 2.

Non-Aircraft Noise Sources

Very few non-aircraft events were reported. Occasionally a car would pass on the very lightly traveled access road. Wildlife and weather also contributed to a lesser degree.

Aircraft Noise Sources

About 12 aircraft events occurred per observation hour. The traffic was dominated by jets heading west, presumably departures from Philadelphia.

Site 13 – Brandywine Battlefield Park – Noise Level Results**Site 13 - Cumulative Statistics**

| | |
|-----------------------|-------------|
| Total Days | 5 |
| Total DNL | 64.4 |
| Aircraft DNL | 53.2 |
| Non-Aircraft DNL | 64.1 |
| L50 | 55.5 |
| Aircraft Events / Day | 31 |
| Aircraft Lmax range | 50.9 - 75.6 |

Site 13 - 10 Most Common Aircraft Noise Events

| Aircraft Type | Operation Type | Airport | Number of Events |
|---------------|----------------|---------|------------------|
| B72Q | D | PHL | 7 |
| B722 | D | PHL | 3 |
| DC8Q | D | PHL | 3 |
| B735 | A | EWR | 2 |
| B741 | D | PHL | 2 |
| C208 | O | UNK | 2 |
| DH8A | D | LGA | 2 |
| A320 | A | LGA | 1 |
| A333 | A | JFK | 1 |
| B733 | D | PHL | 1 |

During the 5 days of measurement, 1398 flights flew within a ground distance of 3.1 miles of Site 13. Of these flights 156 met the thresholds necessary to be called aircraft noise events. These events had Lmax levels ranging from 50.9 to 75.6 dBA. The most common types of aircraft noise events at this site are shown in the above table. A large number of aircraft noise events were attributable to airport PHL, but had unidentifiable aircraft types.

Site 14 – Colts Neck Residence – Site Description

Measurement period

Phase 1 measurement began Monday 12/10/01, and concluded Friday 12/14/01.

Phase 2 measurement began Monday 8/26/02, and concluded Friday 8/30/02.

Location

Site 14 was a residence located on Westminster Drive; Colts Neck, NJ. This location is 26 miles south of Newark (EWR). The monitor was placed in the back yard.

Land Use

The area was a sparsely populated residential setting, with about 10 homes in a 15 acre area. Most of the area was covered with wooded terrain or undeveloped cleared land. The most prominent roadway was Crine Road; a local road located about 250 yards north of the site.



Ambient Noise

Local traffic on nearby roads contributed to the ambient noise. During Phase 2, insect noise heavily influenced the ambient.

Non-Aircraft Noise Sources

Most non-aircraft noise events were caused by automobiles on Westminster Dr., or on Crine Road. These events were recorded 8 to 10 times an hour. There were some events resulting from nearby sawing and lawn mowing. During the second phase, the swimming pool filter periodically turned on providing a boosted ambient level.

Aircraft Noise Sources

The site received a fairly high amount of air traffic with about 20 aircraft events logged per hour. Planes were observed at a variety of altitudes, and most were bearing west. There seemed to be a wide variety of propeller and jet aircraft.

Site 14 – Colts Neck Residence – Noise Level Results**Site 14 - Cumulative Statistics**

| | |
|-----------------------|-------------|
| Total Days | 7 |
| Total DNL | 59.2 |
| Aircraft DNL | 43.0 |
| Non-Aircraft DNL | 59.1 |
| L50 | 43.0 |
| Aircraft Events / Day | 79 |
| Aircraft Lmax range | 41.0 - 75.0 |

Site 14 - 10 Most Common Aircraft Noise Events

| Aircraft Type | Operation Type | Airport | Number of Events |
|---------------|----------------|---------|------------------|
| B762 | D | JFK | 51 |
| MD80 | D | LGA | 38 |
| B763 | D | JFK | 27 |
| B752 | D | JFK | 24 |
| B752 | D | EWR | 22 |
| A320 | D | JFK | 20 |
| B738 | D | EWR | 20 |
| MD80 | D | JFK | 14 |
| B73Q | D | JFK | 11 |
| B735 | D | EWR | 10 |

During the 7 days of measurement, 2551 flights flew within a ground distance of 3.1 miles of Site 14. Of these flights 551 met the thresholds necessary to be called aircraft noise events. These events had Lmax levels ranging from 41.0 to 75.0 dBA. The most common types of aircraft noise events at this site are shown in the above table.

Site 15 – Ardencroft Residence – Site DescriptionMeasurement period

Phase 1 measurement began Monday 12/17/01, and concluded Friday 12/21/01.

Phase 2 measurement began Monday 8/12/02, and concluded Friday 8/16/02.

Location

The monitor was placed in the backyard of a residence on Upsand Downs Lane.; Ardencroft, DE. This location is 14 miles west-southwest of Philadelphia International (PHL).

Land Use

The residence was on the south end of a typical suburban neighborhood. Sparse woods surrounded the area. A school was located about 300 yards to the west and a railroad was located about 300 yards to the southeast. Relevant roadways were:

1. Interstate 95 – about 400 yards southeast of monitor.
2. Upsand Downs Lane – small residential street located approximately 40 yards from monitor with very little traffic.
3. Veale Road – more heavily traveled city street located about 200 yards northeast of monitor.
4. Harvey Road – more heavily traveled city street located about 200 yards northwest of monitor.
5. Several other small city streets around the measurement area.

Ambient Noise

The ambient noise in the area was primarily generated by the local road traffic around the site. During Phase 2, insects heavily influenced the ambient.

Non-Aircraft Noise Sources

Intermittent sources of noise included train and local vehicular traffic, distant hammering, intermittent distant leaf blowing, tree rustling sound due to windy conditions. The resident mowed the lawn on one afternoon during Phase 2.

Aircraft Noise Sources

Approximately 10 aircraft events were recorded per hour. Jet traffic dominated, with most flights being identifiable as arrival or departure routes to or from Philadelphia.



Site 15 – Ardencroft Residence – Noise Level Results

Site 15 - Cumulative Statistics

| | |
|-----------------------|-------------|
| Total Days | 6 |
| Total DNL | 60.9 |
| Aircraft DNL | 49.4 |
| Non-Aircraft DNL | 60.6 |
| L50 | 51.3 |
| Aircraft Events / Day | 57 |
| Aircraft Lmax range | 50.5 - 86.1 |

Site 15 - 10 Most Common Aircraft Noise Events

| Aircraft Type | Operation Type | Airport | Number of Events |
|---------------|----------------|---------|------------------|
| B733 | D | PHL | 19 |
| B733 | A | PHL | 15 |
| MD80 | D | PHL | 11 |
| B72Q | D | PHL | 10 |
| A319 | A | PHL | 8 |
| A320 | A | PHL | 8 |
| A319 | D | PHL | 5 |
| B734 | D | PHL | 5 |
| B734 | A | PHL | 5 |
| B752 | D | PHL | 5 |

During the 6 days of measurement, 3052 flights flew within a ground distance of 3.8 miles of Site 15. Of these flights 339 met the thresholds necessary to be called aircraft noise events. These events had Lmax levels ranging from 50.5 to 86.1 dBA. The most common types of aircraft noise events at this site are shown in the above table. A large number of aircraft noise events were attributable to airport PHL, but had unidentifiable aircraft types.

Site 16 – Garden City Residence – Site DescriptionMeasurement period

Phase 1 measurement began Monday 12/17/01, and concluded Friday 12/21/01.

Phase 2 measurement began Monday 8/12/02, and concluded Friday 8/16/02.

Location

Site 16 was a residence on Dartmouth Street; Garden City, NY. This location is 8 miles northeast of JFK and 11 miles east-southeast of La Guardia (LGA). The monitor was placed in the backyard.

Land Use

Garden City is a densely populated suburban area with 3-4 homes per acre. JFK airport is approximately 7 miles southwest and La Guardia is located approximately 10 miles northwest of the monitor. A city train route was located about ½ miles north of the site. There were no major highways near the monitor, but certainly the site is surrounded by a grid of fairly well traveled local streets.



Ambient Noise

The ambient noise was caused mostly by auto traffic around the site, along with the background noise sources typical of a dense suburban neighborhood. Insects were a major contributor to ambient noise during the second phase.

Non-Aircraft Noise Sources

The main non-aircraft noise sources were cars passing by on Dartmouth Street and trains. Trains passed about 10 times per hour, usually creating noise events with maximums of about between 50 and 55 dBA.

Aircraft Noise Sources

About 10 aircraft events were logged per hour. It is unclear whether distinct routes could be identified and also unclear what distribution of aircraft types caused events.

Site 16 – Garden City Residence – Noise Level Results**Site 16 - Cumulative Statistics**

| | |
|-----------------------|-------------|
| Total Days | 6 |
| Total DNL | 59.0 |
| Aircraft DNL | 52.6 |
| Non-Aircraft DNL | 57.8 |
| L50 | 49.0 |
| Aircraft Events / Day | 61 |
| Aircraft Lmax range | 43.0 - 82.6 |

Site 16 - 10 Most Common Aircraft Noise Events

| Aircraft Type | Operation Type | Airport | Number of Events |
|---------------|----------------|---------|------------------|
| B763 | A | JFK | 39 |
| B772 | A | JFK | 25 |
| B744 | A | JFK | 17 |
| A343 | A | JFK | 14 |
| B742 | A | JFK | 14 |
| SF34 | D | JFK | 14 |
| SF34 | A | JFK | 13 |
| A332 | A | JFK | 9 |
| A333 | A | JFK | 9 |

During the 6 days of measurement, 1475 flights flew within a ground distance of 3.8 miles of Site 16. Of these flights 367 met the thresholds necessary to be called aircraft noise events. These events had Lmax levels ranging from 43.0 to 82.6 dBA. The most common types of aircraft noise events at this site are shown in the above table.

V. Summary

A two-phase noise measurement program was conducted as part of the NY/NJ/PHL/ Airspace Redesign EIS study. The program was undertaken to provide samples of real field noise levels at 16 sites throughout a 30,000+ square mile study area for both winter and summer conditions. In most cases the exact same locations were measured for both the summer and winter phases of the program; however, due to logistical issues, two locations were measured at slightly different sites during the second phase along with one new site that was unavailable during the first phase.

The primary focus of the measurement program was to collect and calculate a sampling of day/night average noise levels (DNL) at each specific site. In addition to the total DNL at each monitoring site, several other metrics were also computed from the measured data as supplemental information. Radar flight track data was also collected during the measurement periods so that aircraft overflights could be correlated with noise levels on the ground at each site.

Table 3 provides a summary of the noise levels recorded during the measurement period for each site. The data for each site is presented in terms of the average DNL values for each phase of the measurement program, as well as the cumulative DNL value for the entire measurement duration at the site. Similarly, the L50 values for each site are also presented.

Table 3
Noise Measurement Summary

| Measured DNL | | | | Measured L ₅₀ | | |
|--------------|---------|----------|------|--------------------------|----------|------|
| Site | Phase I | Phase II | Avg | Phase I | Phase II | Avg |
| 1a | 40.5 | N/A | 40.5 | 31.0 | N/A | 31.0 |
| 1b | N/A | 62.7 | 62.7 | N/A | 47.0 | 47.0 |
| 2 | 44.1 | 48.2 | 46.6 | 34.0 | 35.0 | 34.5 |
| 3 | 60.5 | 58.8 | 59.7 | 53.0 | 49.0 | 51.0 |
| 4 | 54.2 | N/A | 54.2 | 46.0 | N/A | 46.0 |
| 5 | 68.9 | 64.8 | 67.3 | 63.0 | 55.0 | 59.0 |
| 6 | 56.9 | 57.7 | 57.3 | 49.5 | 45.0 | 47.3 |
| 7a | 67.6 | N/A | 67.6 | 52.0 | N/A | 52.0 |
| 7b | N/A | 64.1 | 64.1 | N/A | 51.0 | 51.0 |
| 8 | N/A | 66.1 | 66.1 | N/A | 52.0 | 52.0 |
| 9 | 50.5 | 63.9 | 61.0 | 40.0 | 47.5 | 43.8 |
| 10 | 50.7 | 60.4 | 57.8 | 41.0 | 46.0 | 43.5 |
| 11 | 50.7 | 63.5 | 60.7 | 41.5 | 53.0 | 47.3 |
| 12 | 57.4 | 64.5 | 62.2 | 51.0 | 54.0 | 52.5 |
| 13 | 57.1 | 67.0 | 64.4 | 51.0 | 60.0 | 55.5 |
| 14 | 47.1 | 62.0 | 59.2 | 39.0 | 47.0 | 43.0 |
| 15 | 55.4 | 63.3 | 60.9 | 47.5 | 55.0 | 51.3 |
| 16 | 56.1 | 60.7 | 59.0 | 45.0 | 53.0 | 49.0 |

Source: Landrum & Brown Analysis, 2002-05

It should be noted that both the measured Total DNL and the L50 values collected during Phase II tended to be somewhat higher than the Phase I values at most sites. A detailed analysis of the data and the site observation logs indicate that insect noise (primarily cicadas) during the summer measurement period was a significant contributor to the higher noise level recordings.

Table 4 presents a summary of the noise levels associated with the correlated aircraft radar track events for each measurement site. The number of days correlated, the average number of aircraft events correlated, and the range of the maximum aircraft noise levels are presented along with the DNL noise values. The time and duration of each correlated aircraft event was used to separate out the aircraft noise from other noise recorded during each observation period. This allowed for the calculation of the DNL noise levels associated with only the aircraft events for comparison against the DNL levels from other sources during the observation periods.

Table 4
Aircraft Event Noise Correlation Summary

| Site | Days Correlated | Avg Correlated Day | Aircraft per | Aircraft LAMAX Range (dBA) | Aircraft DNL | Non Aircraft DNL | Total Site DNL |
|------|-----------------|--------------------|--------------|----------------------------|--------------|------------------|----------------|
| 1a | 4 | 15 | | 37.6 – 67.1 | 25.5 | 40.3 | 40.5 |
| 1b | 2 | 5 | | 54.3 – 64.8 | 26.9 | 62.7 | 62.7 |
| 2 | 6 | 3 | | 44.3 - 65.4 | 23.2 | 46.6 | 46.6 |
| 3 | 7 | 39 | | 50.6 - 72.0 | 46.2 | 59.5 | 59.7 |
| 4 | 3 | 22 | | 53.7 - 72.8 | 44.1 | 53.7 | 54.2 |
| 5 | 5 | 12 | | 53.3 - 73.4 | 45.1 | 67.3 | 67.3 |
| 6 | 7 | 71 | | 48.1 - 81.4 | 47.8 | 56.8 | 57.3 |
| 7a | 2 | 308 | | 57.3 - 88.0 | 66.3 | 61.5 | 67.6 |
| 7b | 3 | 244 | | 59.9 - 86.6 | 62.7 | 58.7 | 64.1 |
| 8 | 2 | 149 | | 55.1 - 83.1 | 57.5 | 65.4 | 66.1 |
| 9 | 6 | 124 | | 39.2 - 79.1 | 48.5 | 60.8 | 61.0 |
| 10 | 5 | 126 | | 44.8 - 76.0 | 47.4 | 57.4 | 57.8 |
| 11 | 5 | 54 | | 46.8 - 75.6 | 42.3 | 60.7 | 60.7 |
| 12 | 7 | 126 | | 49.8 - 93.3 | 52.7 | 61.7 | 62.2 |
| 13 | 5 | 31 | | 50.9 - 75.6 | 53.2 | 64.1 | 64.4 |
| 14 | 7 | 79 | | 41.0 - 75.0 | 43.0 | 59.1 | 59.2 |
| 15 | 6 | 57 | | 50.5 - 86.1 | 49.4 | 60.6 | 60.9 |
| 16 | 6 | 61 | | 43.0 - 82.6 | 52.6 | 57.8 | 59.0 |

Source: Landrum & Brown Analysis, 2002-05

Overall, the program collected some 88 site-days of noise level data throughout the two phases of the program. During the measurement periods there were some 32,289 aircraft overflights near the measurement sites with some 6,567 of those being correlated to measured noise events at the time of the overflights. For all of the sites, through both phases of measurements, the maximum noise levels correlated to aircraft overflights ranged from 37.6dB to 93.3 dB. The site average for the lower end of the range was 48.9 dB and 77.7 dB for the upper end of the range.

These findings provide general context of background and cumulative noise levels in which any changes in modeled noise exposure resulting from an airspace alteration can be considered. Although the noise levels presented represent actual measured noise, it should be noted that they are merely samples of noise for relatively small periods of time at a limited number of locations.